



US006342335B1

(12) **United States Patent**  
Fujita et al.

(10) Patent No.: **US 6,342,335 B1**  
(45) Date of Patent: **Jan. 29, 2002**

(54) **POLYMETHINE COMPOUNDS, METHOD OF PRODUCING SAME, AND USE THEREOF**

(75) Inventors: Shigeo Fujita, Osaka; Nobuaki Sasaki; Keiki Chichilishi, both of Kyoto; Yasuhisa Iwasaki, Nara, all of (JP)

(73) Assignee: Yamamoto Chemicals, Inc., Osaka (JP)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: 09/598,044

(22) Filed: Jun. 20, 2000

(30) Foreign Application Priority Data

Jun. 21, 1999 (JP) ..... 11-174235

(51) Int. Cl.<sup>7</sup> ..... G03F 7/00

(52) U.S. Cl. .... 430/270.1; 430/302; 430/944; 430/945; 101/463.1; 101/453; 548/469

(58) Field of Search ..... 430/270.1, 302, 430/944, 945, 270.11, 270.21; 101/453, 463.1; 548/469

(56) References Cited

#### U.S. PATENT DOCUMENTS

4,973,572 A \* 11/1990 DeBoer ..... 503/227  
4,987,021 A \* 1/1991 Kanno et al. .... 428/64  
5,814,431 A \* 9/1998 Nagasaka et al. .... 430/281.1

#### FOREIGN PATENT DOCUMENTS

EP 1063231 A1 \* 12/2000  
JP 62-187091 A \* 8/1987  
JP 62-207685 A \* 9/1987  
JP 62-082080 A \* 4/1997

#### OTHER PUBLICATIONS

Narayanan, Narasimbachari and Gabor Patonay. "A New Method for the Synthesis of Heptamethine Cyanine Dyes:

Synthesis of New Near-Infrared Fluorescent Labels." J. Org. Chem. 60 (1995): 2391-2395.\*

\* cited by examiner

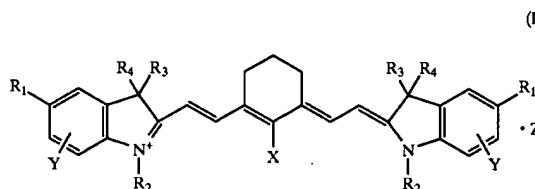
Primary Examiner—Janet Baxter

Assistant Examiner—Barbara Gilmore

(74) Attorney, Agent, or Firm—Birch, Stewart, Kolasch & Birch, LLP

(57) **ABSTRACT**

The invention provides near infrared absorbing materials showing high light-to-heat conversion efficiency and high sensitivity to lasers whose emission bands are within the range of 750 nm to 900 nm, original plates for direct printing plate making, and novel compounds which can be applied to such absorbing materials and plates. The compounds are polymethine compounds of the general formula (I). A detailed description of general formula (I) may be found in the specification.



wherein R<sub>1</sub> represents an alkoxy group which may be substituted; R<sub>2</sub> represents an alkyl group which may be substituted; R<sub>3</sub> and R<sub>4</sub> each represents a lower alkyl group or R<sub>3</sub> and R<sub>4</sub> taken together represent a ring; X represents a hydrogen atom, a halogen atom or a substituted amino group; Y represents an alkoxy group which may be substituted or an alkyl group which may be substituted; Z represents a charge neutralizing ion.

15 Claims, 15 Drawing Sheets

